Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (currently amended) A system for testing a physical attribute of a manufactured object, the system comprising:

a laser ultrasound generation system ~~to generate an ultrasonic signal within with the manufactured object with at least one laser pulse~~;

a beam of coherent electromagnetic energy directed from the laser ultrasound generation system;

a beam splitter in the path of the beam of coherent electromagnetic energy;

a two wave mixing interferometer;

a probe beam from the beam splitter directed at the manufactured object that reflects from the manufactured object with an altered wave characteristic thereby defining a resulting beam;

a pump beam from the beam splitter directed at a wave characteristic adjusting device having an electro-optic polarizer in communication with a portion of the pump beam, a first electro-optic phase modulator in communication with a portion of the pump beam when the electro-optic polarizer operates in a first mode, and a second electro-optic phase modulator in communication with a portion of the pump beam when the electro-optic polarizer operates in a second mode, so that when the pump beam is communicated with the at least one of the first or second electro-optic phase modulators, the pump beam is frequency adjusted;

a two wave mixing interferometer in communication with the resulting beam and the frequency adjusted pump beam and in communication with the wave characteristic adjusting device, so that the frequency adjustment of the pump beam is based on a comparison of the pump beam and the resulting beam ~~measures the ultrasonic signal, using:~~

~~a probe of coherent electromagnetic energy; and~~

~~a pump beam of coherent electromagnetic energy, wherein the probe beam of coherent electromagnetic energy scans across the manufactured object, wherein scanning the probe beam alters a wave characteristic of the two wave mixing interferometer, and is scattered or reflected by the manufactured object;~~

~~at least one wave characteristic adjusting device coupled to the two wave mixing interferometer~~ that compensates for ~~the~~ altered wave characteristics caused by a~~the~~ scanning motion of the probe beam ~~of the two wave mixing interferometer~~.

2. (currently amended) The system of Claim 1, further comprising a processor in communication with the two wave mixing interferometer and the wave characteristic adjusting device, so that when information is communicated from the two wave mixing interferometer to the processor indicative of interaction between the pump beam and the resulting beam the processor determines a wave characteristic adjustment required to compensate for the scanning motion of the beam that is communicated to the wave characteristic adjusting device ~~wherein the at least one wave characteristic adjusting device is situated in the optical path of the pump beam~~.

3. (currently amended) The system of Claim 1, wherein the resulting beam reflects from the manufactured object with an altered wave characteristic having components indicative of a sonic energy signal and the scanning motion of the resulting beam~~at least one wave characteristic adjusting device is situated in the optical path of the probe beam~~.

4. (currently amended) The system of Claim 1, wherein the probe beam is directed at the manufactured object from a scanning mirror ~~the system further comprising:~~

~~a wave characteristic controlling system, the wave characteristic controlling system operable to direct the at least one wave characteristic adjusting device~~.

5. -13 (cancelled).

14. (previously presented) A wave characteristic adjusting device for adjusting a wave characteristic of a beam of coherent electromagnetic energy distorted by scanning the beam of coherent electromagnetic energy, wherein the beam of coherent electromagnetic energy being of a two-wave mixing interferometer, the wave characteristic adjusting device comprising:

an electro-optic polarizer situated in a path of the beam of coherent electromagnetic energy;

a polarized beam deflector situated in the path of the beam of coherent electromagnetic energy;

a first electro-optic phase modulator;

a second electro-optic phase modulator;

the beam of coherent electro-magnetic energy selectively passing through the polarized beam deflector to the first electro-optic phase modulator if the electro-optic polarizer has a first specific operating characteristic;

the electro-optic phase modulator continuously altering a wave characteristic of the beam of coherent electromagnetic energy;

the beam of coherent electromagnetic energy selectively deflecting from the polarized beam deflector to the second electro-optic phase modulator if the electro-optic polarizer has a second specific operating characteristic;

the second electro-optic phase modulator continuously altering the wave characteristic of the beam of coherent electromagnetic energy;

the electro-optic polarizer operable to switch modes; and

the wave characteristic of the beam of coherent electromagnetic energy being altered to compensate for a wave characteristic distortion caused by a scanning motion of a probe beam of the two-wave mixing interferometer.

15. (original) The wave characteristic adjusting device of Claim 14 wherein the beam of coherent electromagnetic energy is the probe beam of the two-wave mixing interferometer.

16. (original) The wave characteristic adjusting device of Claim 14 wherein the beam of coherent electromagnetic energy is a pump beam of the two-wave mixing interferometer.

17. -22 (cancelled).

23. (currently amended) A system for detecting a sonic energy signal associated with a manufactured object, the system comprising:

a probe beam of coherent electromagnetic energy;

a pump beam of coherent electromagnetic energy;

the probe beam being scanned across a surface of the manufactured object, wherein the probe beam is distorted by scanning;

the probe beam reflecting from the manufactured object with an altered wave characteristic indicative of a scanning motion of the probe beam;

the probe beam being directed to a two-wave mixing interferometer;

either one of the probe beam or the pump beam of coherent electromagnetic energy passing through a wave characteristic adjusting device, the wave characteristic adjusting device communicatively coupled to a wave characteristic controlling system;

the wave characteristic adjusting device operable to adjust a wave characteristic of the either one of the probe beam or pump beam, in order to compensate for distortion caused by scanning the probe beam;

a synthetic signal generator in a path of the probe beam of coherent electromagnetic energy, so that when the probe beam passes through the synthetic signal generator, a synthetic coherent electromagnetic energy signal is added to the probe beam of coherent electromagnetic energy;

the either one of the probe beam or the pump beam being directed to the two-wave mixing interferometer; and

the wave characteristic controlling system operable to direct the wave characteristic adjusting device to adjust the wave characteristic of the either one of the probe beam or the pump beam.

24. (original) The system of Claim 23, the system further comprising:

the two-wave mixing interferometer communicatively coupled to the wave characteristic controlling system, the two-wave mixing interferometer passing data to the wave characteristic controlling system; and

the wave characteristic controlling system directing the wave characteristic adjusting device to adjust the wave characteristic of the either one of the probe beam or the pump beam of coherent electromagnetic energy using the data from the two-wave mixing interferometer.

25. (original) The system of Claim 23, the system further comprising:

the two-wave mixing interferometer communicatively coupled to the wave characteristic controlling system; and

the wave characteristic controlling system operable to adjust a parameter of the two-wave mixing interferometer.

26. (cancelled).

27. (currently amended) The system of Claim ~~26~~ 23 wherein the wave characteristic controlling system directs the wave characteristic adjusting device to adjust the wave characteristic of the either one of the probe beam or the pump beam of coherent electromagnetic energy using information about the synthetic signal generator.

28. (currently amended) The system of Claim 23, the system further comprising:

~~the~~ a synthetic signal generator communicatively coupled to the wave characteristic controlling system; and

the wave characteristic controlling system operable to direct the synthetic signal generator to add the synthetic coherent electromagnetic energy signal to the probe beam of coherent electromagnetic energy.

29. (original) The system of Claim 23, the system further comprising:

a database having information;

the database communicatively coupled to the wave characteristic controlling system; and

the wave characteristic controlling system operable to direct the wave characteristic adjusting device to adjust the wave characteristic of the either one of the probe beam or the pump beam of coherent electromagnetic energy using the information from the database.

30. (previously presented) The system of Claim 29 wherein the information in the database is information about the manufactured object.

31. (previously presented) The system of Claim 29 wherein the information in the database is information obtained from a previous detection.

32. (original) The system of Claim 23, the system further comprising:

a representation of the manufactured object; and

the wave characteristic controlling system operable to direct the wave characteristic adjusting device to adjust the wave characteristic of the either one of the probe beam or the pump beam of coherent electromagnetic energy using the representation of the manufactured object.

33. (original) The system of Claim 32 wherein the representation of the manufactured object is a computer-aided-drafting representation of the manufactured object.

34. (original) The system of Claim 23, the system further comprising:

a shape measuring device;

the shape measuring device communicatively coupled to the wave characteristic controlling system;

the shape measuring device operable to measure the shape of the manufactured object; and

the wave characteristic controlling system operable to direct the wave characteristic adjusting device to adjust the wave characteristic of the either one of the probe beam or the pump beam of coherent electromagnetic energy using an information from the shape measuring device.

35-39 (cancelled).

40. (currently amended) A method for testing a physical attribute of a manufactured object, the method comprising:

splitting a coherent beam of electromagnetic energy into a probe beam and a pump beam;

forming a reflected resulting beam by scanning the manufactured object with the probe beam;

determining a wave frequency adjustment required to compensate for a scanning motion of the probe beam by measuring the interaction between the pump beam and the resulting beam; and

adjusting the phase of the pump beam based on determining the wave frequency adjustment by passing at least a portion of the pump beam through a continuously phase changing phase modulator~~generating an ultrasonic signal associated with the manufactured object with at least one laser pulse;~~

~~measuring the ultrasonic signal with a two wave mixing interferometer, the two wave mixing interferometer having a probe beam of coherent electromagnetic energy and a pump beam of coherent electromagnetic energy;~~

~~scanning the probe beam of coherent electromagnetic energy across the manufactured object, wherein scanning alters a wave characteristic of the probe beam; and~~

~~adjusting a wave characteristic of at least one beam of coherent electromagnetic energy with at least one wave characteristic adjusting device~~ to compensate for the altered wave characteristic caused by the scanning motion of the probe beam of the two wave mixing interferometer.

41. (original) The method of Claim 40 wherein the at least one wave characteristic adjusting device is situated in the optical path of the pump beam.

42. (original) The method of Claim 40 wherein the at least one wave characteristic adjusting device is situated in the optical path of the probe beam.

43. (original) The method of Claim 40, the method further comprising:

directing the at least one wave characteristic adjusting device with a wave characteristic controlling system.

44-51 (cancelled).

52. (previously presented) A method for adjusting a wave characteristic of a beam of coherent electromagnetic energy with a wave characteristic adjusting device, in order to compensate for wave distortion caused by scanning a probe beam, wherein the beam of coherent electromagnetic energy being of a two-wave mixing interferometer, the method comprising:

selectively passing the beam of coherent electro-magnetic energy through a polarized beam deflector situated in a path of the beam of coherent electromagnetic energy to a first electro-optic phase modulator if an electro-optic polarizer situated in the path of the beam of coherent electromagnetic energy has a first specific operating characteristic;

continuously altering a wave characteristic of the beam of coherent electromagnetic energy with the electro-optic phase modulator;

selectively deflecting the beam of coherent electromagnetic energy from the polarized beam deflector to the second electro-optic phase modulator if the electro-optic polarizer has a second specific operating characteristic;

continuously altering the wave characteristic of the beam of coherent electromagnetic energy with the second electro-optic phase modulator;

the electro-optic polarizer operable to switch modes; and

the wave characteristic of the beam of coherent electromagnetic energy being altered to compensate for a wave characteristic distortion caused by a scanning motion of a probe beam of the two-wave mixing interferometer.

53. (original) The method of Claim 52 wherein the beam of coherent electromagnetic energy is the probe beam of the two-wave mixing interferometer.

54. (original) The method of Claim 52 wherein the beam of coherent electromagnetic energy is a pump beam of the two-wave mixing interferometer.

55-60 (cancelled).

61. (currently amended) A method for detecting a sonic energy signal associated with a manufactured object, the method comprising:

scanning a probe beam of coherent electromagnetic energy across a surface of the manufactured object, wherein scanning distorts a wave characteristic of the probe beam;

the probe beam reflecting from the manufactured object with an altered wave characteristic indicative of a scanning motion of the probe beam;

directing the probe beam to a two-wave mixing interferometer;

passing either one of the probe beam or the pump beam of coherent electromagnetic energy through a wave characteristic adjusting device, the wave characteristic adjusting device communicatively coupled to a wave characteristic controlling system;

adjusting a wave characteristic of the either one of the probe beam or the pump beam with the wave characteristic adjusting device, in order to compensate for the wave distortion caused by scanning the probe beam;

adding a synthetic coherent electromagnetic energy signal to the probe beam of coherent electromagnetic energy with a synthetic signal generator situated in a path of the probe beam of coherent electromagnetic energy;

directing the pump beam to the two-wave mixing interferometer; and

directing the wave characteristic adjusting device with the wave characteristic controlling system to adjust the wave characteristic of the either one of the probe beam or the pump beam to compensate for distortion caused by scanning the probe beam.

62. (original) The method of Claim 61, the method further comprising:

passing data to the wave characteristic controlling system from the two-wave mixing interferometer; and

directing the wave characteristic adjusting device to adjust the wave characteristic of the either one of the probe beam or the pump beam of coherent electromagnetic energy with the wave characteristic controlling system using the data from the two-wave mixing interferometer.

63. (original) The method of Claim 61, the method further comprising:

adjusting a parameter of the two-wave mixing interferometer with the wave characteristic controlling system.

64. (cancelled).

65. (currently amended) The method of Claim ~~64~~ 61 wherein the wave characteristic controlling system directs the wave characteristic adjusting device to adjust the wave characteristic of the either one of the probe beam or pump beam of coherent electromagnetic energy using information about the synthetic signal generator.

66. (currently amended) The system of Claim ~~65~~61, the method further comprising:

directing the synthetic signal generator to add the synthetic coherent electromagnetic energy signal to the probe beam of coherent electromagnetic energy, the directing being performed by the wave characteristic controlling system.

67. (original) The method of Claim 61, the method further comprising:

directing the wave characteristic adjusting device to adjust the wave characteristic of the either one of the probe beam or pump beam of coherent electromagnetic energy with the wave characteristic controlling system, the wave characteristic controlling system using an information from a database.

68. (original) The method of Claim 67 wherein the information in the database is information about the manufactured object.

69. (original) The method of Claim 67 wherein the information in the database is information obtained from a previous detection.

70. (original) The system of Claim 61, the system further comprising:

directing the wave characteristic adjusting device to adjust the wave characteristic of the either one of the probe beam or the pump beam of coherent electromagnetic energy with the wave characteristic controlling system, the wave characteristic controlling system using a representation of the manufactured object.

71. (original) The method of Claim 70 wherein the representation of the manufactured object is a computer-aided-drafting representation of the manufactured object.

72. (original) The method of Claim 70, the method further comprising:

directing the wave characteristic adjusting device to adjust the wave characteristic of the either one of the probe beam or the pump beam of coherent electromagnetic energy with the wave characteristic controlling system, the wave characteristic controlling system using data from the two-wave mixing interferometer.

73. (original) The method of Claim 61, the method further comprising:

measuring a shape of the manufactured object with a shape measuring device communicatively coupled to the wave characteristic controlling system; and

directing the wave characteristic adjusting device to adjust the wave characteristic of the either one of the probe beam or the pump beam of coherent electromagnetic energy with the wave characteristic controlling system, the wave characteristic controlling system using an information from the shape measuring device.

74. (original) The method of Claim 73, the method further comprising:

directing the wave characteristic adjusting device to adjust the wave characteristic of the either one of the probe beam or pump beam of coherent electromagnetic energy with the wave characteristic controlling system, the wave characteristic controlling system using the data from the two-wave mixing interferometer.

75 – 78 (cancelled).